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WASHINGTON STATE VENTILATION AND INDOOR AIR QUALITY CODE
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For alternate formats, call 206-296-6600.

VIAQ - INTEGRATED WITH A FORCED AIR SYSTEM (# VIAQ 3)

Prescriptive design requirements for intermittently operated integrated forced air ("whole house ventilation") systems for residences four stories or less may comply with V.I.A.Q.C., section 303 as indicated below. Residences designed to comply with section 302 shall submit calculations for review and be flow tested per section 302.1.1. System characteristics not identified below and continuously operated systems shall comply with section 302. Residences more than four stories in height shall comply with section 304.

A. SOURCE SPECIFIC VENTILATION REQUIREMENTS:

1. **EXHAUST FAN REQUIREMENTS (Reference Table 3-1):**
   a) Bathrooms, laundries, and powder rooms: 50 CFM @ 0.25" W.G.
   b) Kitchens: 100 CFM @ 0.25" W.G. Range hoods and down draft ranges shall be rated not less than 100 CFM @ 0.10" W.G.

2. **EXHAUST DUCT REQUIREMENTS:**
   a) Be insulated to a minimum R-4 in unconditioned spaces.
   b) Be equipped with a back-draft damper.
   c) Terminate outside the building.
   d) Comply with Table 3-3 and section 303.3.4.

NOTE: *All manufacturer's fan flow ratings shall be determined as per HVI 916 (April 1995) or AMCA 210.*

B. WHOLE HOUSE VENTILATION REQUIREMENTS:

Outdoor air shall be supplied to all habitable rooms through the forced air system (at flow rates specified in Table 3-2) using the following methods:

1. **FRESH AIR INLET DUCT SHALL COMPLY WITH THE FOLLOWING:**
   a) Be sized according to Table 3-5.
   b) Be ducted from the exterior and connected to the return air stream, at a point within four feet upstream of the furnace air handler (note: shall <u>not</u> be connected directly into the furnace cabinet).
   c) Be insulated to a minimum R-4 when located within heated areas.
   d) Inlets shall be screened from entry by leaves and other materials.
   e) Not to receive fresh air from the following areas:
      1. Within ten feet of an appliance vent outlet, unless the vent outlet is three feet above the fresh air inlet.
      2. Where it will pick up objectionable odors, fumes, or flammable vapors.
      3. A hazardous or unsanitary location.
      4. A room or space having any fuel burning appliances therein.
      5. Closer than 10' from a vent opening of a plumbing drainage system unless the vent opening is at least three feet above the air inlet.
      6. Attics, crawl spaces, or garages.

2. **THE INLET DUCT SHALL BE EQUIPPED WITH ONE OF THE FOLLOWING:**
   a) The inlet duct shall be equipped with a motorized damper connected to the automatic ventilation control timer; <u>or</u>
   b) A fixed damper installed and set to meet minimum flow rates as specified in Table 3-2; <u>or</u>
   c) An automatic flow regulating device with field measured minimum negative pressure of 0.07 inches water gauge at the point where the outside air duct is connected to the return air plenum.

NOTE: *All manufacturer's fan flow ratings shall be determined as per HVI 916 (April 1995) or AMCA 210.*

C. VENTILATION SYSTEM CONTROLS:

A 24-hour clock timer shall be installed in a readily accessible location. The timer shall be capable of continuous operation and have an automatic and manual control. At the time of the final inspection the timer shall be set to operate the whole house ventilation system for a minimum of eight hours a day. **<u>A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)". Installers shall provide the manufacturer's installation, operation instructions, and a whole house ventilation system operation description.</u>**

D. VENTILATION SYSTEM TESTING:

At the discretion of the building official, flow testing may be required to verify that the mechanical system(s) satisfies the requirements of section 303.

NOTE: *King County recommends the installation of a centrally located whole house exhaust fan with a maximum sone rating of 1.5 and sized according to Table 3-2 and connected to the automatic control timer. This will facilitate fresh air distribution and reduce the possibility of moisture-laden air being driven into the building cavities. Interior doors should be undercut one half inch above the finished floor covering.*

TABLE 3-1
Minimum Source Specific Ventilation Capacity Requirements

	Bathrooms	Kitchens
Intermittently operating	50 cfm	100 cfm
Continuous operation	20 cfm	25 cfm

TABLE 3-2
Ventilation Rates For All Group R occupancies four (4) stories and less*
Minimum and Maximum Ventilation Rates: Cubic Feet Per Minute (CFM)

Floor Area, ft²	Bedrooms													
	2 or less		3		4		5		6		7		8	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
<500	50	75	65	98	80	120	95	143	110	165	125	188	140	210
501-1000	55	83	70	105	85	128	100	150	115	173	130	195	145	218
1001-1500	60	90	75	113	90	135	105	158	120	180	135	203	150	225
1501-2000	65	98	80	120	95	143	110	165	125	188	140	210	155	233
2001-2500	70	105	85	128	100	150	115	173	130	195	145	218	160	240
2501-3000	75	113	90	135	105	158	120	180	135	203	150	225	165	248
3001-3500	80	120	95	143	110	165	125	188	140	210	155	233	170	255
3501-4000	85	128	100	150	115	173	130	195	145	218	160	240	175	263
4001-5000	95	143	110	165	125	188	140	210	155	233	170	255	185	278
5001-6000	105	158	120	180	135	203	150	225	165	248	180	270	195	293
6001-7000	115	173	130	195	145	218	160	240	175	263	190	285	205	308
7001-8000	125	188	140	210	155	233	170	255	185	278	200	300	215	323
8001-9000	135	203	150	225	165	248	180	270	195	293	210	315	225	338
>9000	145	218	160	240	175	263	190	285	205	308	220	330	235	353

*For residences that exceed 8 bedrooms, increase the minimum requirement listed for 8 bedrooms by an additional 15 CFM per bedroom. The maximum CFM is equal to 1.5 times the minimum.

TABLE 3-3
Prescriptive Exhaust Duct Sizing

Fan Tested CFM @ 0.25 W.G.	Minimum Flex Diameter	Maximum Length Feet	Minimum Smooth Diameter	Maximum Length Feet	Maximum Elbows[1]
50	4 inch	25	4 inch	70	3
50	5 inch	90	5 inch	100	3
50	6 inch	No Limit	6 inch	No Limit	3
80	4 inch[2]	NA	4 inch	20	3
80	5 inch	15	5 inch	100	3
80	6 inch	90	6 inch	No Limit	3
100	5 inch[2]	NA	5 inch	50	3
100	6 inch	45	6 inch	No Limit	3
125	6 inch	15	6 inch	No Limit	3
125	7 inch	70	7 inch	No Limit	3

1. For each additional elbow subtract 10 feet from length.
2. Flex ducts of this diameter are not permitted with fans of this size.

TABLE 3-5
Prescriptive Integrated Forced Air Supply Duct Sizing

Required Flow (CFM) Per Table 3-2	Minimum Smooth Duct Diameter	Minimum Flexible Duct Diameter	Maximum Length[1]	Maximum Number of Elbows[2]
50-80	6"	7"	20'	3
80-125	7"	8"	20'	3
115-175	8"	10"	20'	3
170-240	9"	11"	20'	3

1. For lengths over 20 feet increase duct diameter 1 inch.
2. For elbows numbering more than 3 increase duct diameter 1 inch.

Check out the DDES Web site at www.metrokc.gov/ddes